REMARKS

Claims 24-34 were presented for examination, claims 1-23 having been withdrawn in response to a Restriction Requirement. Claim 24 is independent.

On entry of this Response, claim 24 is amended. Claims 32-34 are canceled for consistency with amended claim 24. No new matter is added. Applicants respectfully submit that claims 24-31 define over the prior art of record.

I. Amendments to the Claims

Claim 24 is amended herein to recite that the wet acid etchant comprises an oxidizing agent in an amount of 0.4 to 5.3 wt%. Support for this amendment can be found, for example, in Tables 2, 3, 5, and 7, and Figures 3 and 5.

In the above-cited passages, the application describes an oxidant (H_2O_2 in one embodiment) in an amount of 0.35% to 4.8% in terms of volume. The amendment to claim 1 recites these 0.4 % to 5.3% in terms of weight. The volume amounts described in the specification directly correspond to the weight amounts recited in the present claims. The calculations used to convert the amount of oxidizing agent from vol% to wt% are shown in Appendix A, attached. This conversion is a well-known technique that would be readily understood by one of ordinary skill in the art. The conversion was done for ease of comparison to the cited references.

II. Claim Rejections under 35 U.S.C. §103(a)

A. Rejections in view of Mishurnyi and Wu

Claims 24 and 32-34 stand rejected under 35 U.S.C. §103(a) as being obvious over Mishurnyi *et al.* ("Multicomponent Sb-based solid solutions grown from Sb-rich liquid phases") in view of Wu *et al.* ("Sulphur Passivation of the InGaASb/GaSb Photodiodes"). Applicants respectfully traverse this rejection in view of the amended claims.

Amended independent claim 24 recites:

24. A system for preparing a semiconductor structure, the system comprising;

an $Al_{1-x-z}Ga_xIn_zAs_{1-y}Sb_y$ material with $0<x<1$, $0<y<1$, $0<z<1$ and $0<x+z<1$; and

a wet acid etchant for wet acid etching of a portion of the $Al_{1-x-z}Ga_xIn_zAs_{1-y}Sb_y$ material to form an etched material, the wet acid etchant comprising:

a) organic acid;

b) ***oxidizing agent in an amount of 0.4 to 5.3 wt%***;

c) hydrofluoric acid; and

d) water.

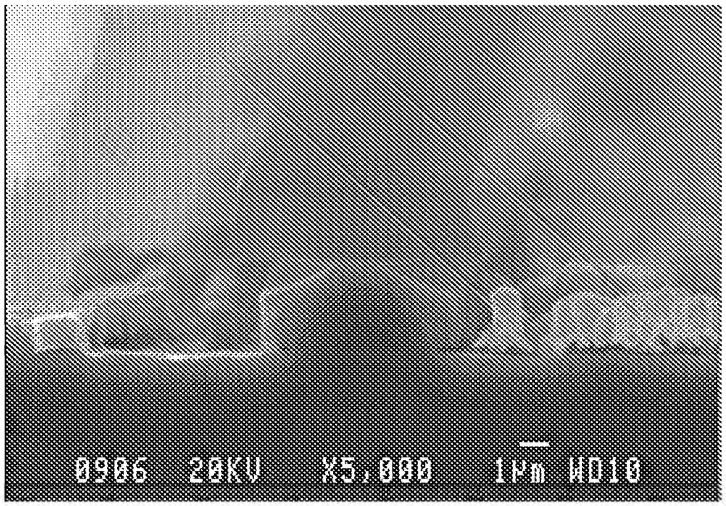
Claim 24 is rejected on the basis of prior disclosed information by V.A.Mishurnyi et al. which shows that the material AlGaAsSb and AlGaInAsSb has previously been manufactured through epitaxial deposition. The presently claimed invention does not cover the manufacturing of AlGaAsSb or AlGaInAsSb epitaxial layers, but of a semiconductor structure prepared by wet etching of these layers. At the time of the invention, there was no existing etchant known to etch AlGaAsSb or AlGaInAsSb with a resulting smooth surface for semiconductor use, although a number of acids were known to attack these materials.

Indeed, the Examiner recognizes that Mishurnyi does not etch the AlGaInAsSb material (Office Action at page 3). Instead, the Examiner relies on Wu for etching and a particular etchant. However, Wu utilizes a greater amount of oxidizing agent than recited in the present claims.

In Wu, an etching solution, usually provided for etching of GaSb, is used on GaInAsSb (note the absence of Al). Wu utlizies H_2O_2 as an oxidizing agent (Wu at page 1303). .

In contrast, the present application addresses the etching of a portion of an $Al_{1-x-z}Ga_xIn_zAs_{1-y}Sb_y$ material. When it comes to etching of AlGaInAsSb (which is described in the present application and recited in the present claims), the Al will be oxidized by H_2O_2 (which Wu utilizes as an oxidizing agent). Thus, the concentration of the oxidizing agent (H_2O_2) is of importance. Wu is not concerned with this type of oxidation, because Wu's material does not contain Al. Thus, Wu can use a high concentration of H_2O_2.

In the case of Al, however, high concentrations of H_2O_2 result in formation of oxides, and leave residues of oxides on the surface. The resulting structure in AlGaInAsSb has an irregular surface with lumps of oxides, as shown in the picture below:



Accordingly, claim 24 requires that the wet acid agent comprises an oxidizing agent in an amount between 0.4 and 5.3 wt%. This concentration is low enough to form a suitable etch without excessively oxidizing the Al.

Wu also describes the use of an oxidizing agent (H_2O_2); however, Wu's solution utilizes 7.97 wt% of H_2O_2 (Wu at page 1303). This is higher than the amount recited in the present claims and would result in the irregular lumps depicted above, due to the oxidization of the Al. Using Wu's solution on a material containing Al would be problematic due to etching residues.

Thus, Mishurnyi does not disclose an etching solution, and although Wu describes an etching solution, Wu utilizes an excessive amount of oxidizing agent (as compared to the range recited in claim 24). Thus, Applicants respectfully submit that Mishurnyi and Wu, alone or in any reasonable combination, do not disclose or suggest each and every element of amended claim 24. Therefore, Applicants respectfully request that the Examiner reconsider and withdraw the rejection of claim 24 under 35 U.S.C. §103(a).

As claims 32-34 are canceled herein, Applicants respectfully submit that the rejection of claims 32-34 is moot.

B. Rejections in view of Mishurnyi, Wu, and Garbuzov

Claim 25 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Mishurnyi *et al.* or Mishurnyi *et al.* in view of Wu *et al.*, and further in view of Garbuzov *et al.* ("2.3-2.7-μm Room Temperature CW Operation of InGaAsSb-AlGaAsSb Broad Waveguide SCH-QW Diode Lasers"). See Office Action, page 5. Applicants respectfully traverse this rejection in view of the amended claims.

Claim 25 depends from claim 24 and, as such, incorporates all of the features recited in claim 24. Applicants respectfully submit that Mishurnyi *et al.*, Wu *et al.* and Garbuzov *et al.*, alone or in any reasonable combination, do not teach or suggest an ***oxidizing agent in an amount of 0.4 to 5.3 wt%*** as recited in claim 24, from which claim 25 depends.

As discussed above, Mishurnyi *et al.* and Wu *et al.* do not teach or suggest the above feature.

Garbuzov *et al.* is cited by the Examiner to provide teachings for the feature added in claim 25. Garbuzov *et al.*, however, does not teach or suggest an ***oxidizing agent in an amount of 0.4 to 5.3 wt%*** as recited in claim 24, from which claim 25 depends. Although Garbuzov *et al.* is combined with Mishurnyi *et al.* and Wu *et al.*, the combination does not teach or suggest the above feature.

For the reasons set forth above, Applicants respectfully submit that Mishurnyi *et al.*, Wu *et al.* and Garbuzov *et al.*, alone or in any reasonable combination, do not teach or suggest all of the limitations of claim 25. Therefore, Applicants respectfully request that the Examiner reconsider and withdraw the above rejection of claim 25.

C. Rejections in view of Mishurnyi, Wu, and Deryagin

Claims 26-31 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Mishurnyi *et al.* or Mishurnyi *et al.* in view of Wu *et al.*, and further in view of Deryagin *et al.* ("High Quality AlGaSb, AlGaAsAb and InGaAsSb epitaxial layers grown by liquid-phase epitaxy from Sb-rich melts"). Applicants respectfully traverse this rejection in view of the amended claims.

Claim 26-31 depend from amended claim 24 and, as such, incorporate all of the features recited in amended claim 24. Applicants respectfully submit that Mishurnyi *et al.*, Wu *et al.* and

Deryagin *et al.*, alone or in any reasonable combination, do not teach or suggest an ***oxidizing agent in an amount of 0.4 to 5.3 wt%*** as recited in claims 26-31.

As discussed above, Mishurnyi *et al.* and Wu *et al.* do not teach or suggest the above feature.

Deryagin *et al.* is cited by the Examiner to provide teachings for the feature added in claims 26-31. Deryagin *et al.*, however, does not teach or suggest an ***oxidizing agent in an amount of 0.4 to 5.3 wt%*** as recited in claim 24. Although Deryagin *et al.* is combined with Mishurnyi *et al.* and Wu *et al.*, the combination does not teach or suggest the above feature.

For the reasons set forth above, Applicants respectfully submit that Mishurnyi *et al.*, Wu *et al.* and Deryagin *et al.*, alone or in any reasonable combination, do not teach or suggest all of the limitations of claims 26-31. Therefore, Applicants respectfully request that the Examiner reconsider and withdraw the rejection of claims 26-31 under 35 U.S.C. §103(a).

CONCLUSION

In view of the above comments, Applicants believe that the pending application is in condition for allowance and urges the Examiner to pass the claims to allowance. Should the Examiner feel that a teleconference would expedite the prosecution of this application, the Examiner is urged to contact the Applicant's attorney at (617) 227-7400.

Please charge any shortage or credit any overpayment of fees to our Deposit Account No. 12-0080, under Order No. BRW-002USRCE2. In the event that a petition for an extension of time is required to be submitted herewith, and the requisite petition does not accompany this response, the undersigned hereby petitions under 37 C.F.R. §1.136(a) for an extension of time for as many months as are required to render this submission timely. Any fee due is authorized to be charged to the aforementioned Deposit Account.

Dated: November 3, 2010

Respectfully submitted,

Electronic signature: /Anthony A. Laurentano/
Anthony A. Laurentano
Registration No.: 38,220
NELSON MULLINS RILEY &
SCARBOROUGH, LLP
One Post Office Square
Boston, Massachusetts 02109-2127
(617) 227-7400
(617) 742-4214 (Fax)
Attorney/Agent For Applicant

APPENDIX A

2,5 M citric acid	480g/L		0,48 g/mL						
22,5M HF	450g/L		0.45						
9,8M H2O2	333 g/L		0.33						
HF (mL)	HF (g)	% wt/v HF	2,5M citric acid (ml)	citric acid (g)	% wt/v org acid%	H2O2 (mL)	H2O2 (g)	% wt/v H2O2	total (mL)
0		0	100	48	40	20	6.60	5.5	120
1	0.5	0.4	100	48	39.7	20	6.60	5.5	121
3	1.4	1.1	100	48	39.0	20	6.60	5.4	123
5	2.3	1.8	100	48	38.4	20	6.60	5.3	125
5	2.3	2.1	100	48	45.2	1.25	0.41	0.4	106.25
5	2.3	2.1	100	48	44.7	2.5	0.83	0.8	107.5
5	2.3	2.0	100	48	41.7	10	3.30	2.9	115
5	2.3	1.8	100	48	38.4	20	6.60	5.3	125
			2,5M lactic acid (mL)						
5	2.3	2.1	100	22.5	21.2	1.25	0.41	0.4	106.25
5	2.3	2.1	100	22.5	20.9	2.5	0.83	0.8	107.5
5	2.3	2.0	100	22.5	19.6	10	3.30	2.9	115
5	2.3	1.8	100	22.5	18.0	20	6.60	5.3	125
			2,5M citric acid (mL						
5	2.3	2.1	100	15	14.1	1.25	0.41	0.4	106.25
5	2.3	2.1	100	15	14.0	2.5	0.83	0.8	107.5
5	2.3	2.0	100	15	13.0	10	3.30	2.9	115
5	2.3	1.8	100	15	12.0	20	6.60	5.3	125
			2,5M tartaric acid						
0	0	0.0	100	37.52	31.3	20	6.60	5.5	120
1	0.5	0.4	100	37.52	31.0	20	6.60	5.5	121

3	1.4	1.1	100	37.52	30.5	20	6.60	5.4	123
5	2.3	1.8	100	37.52	30.0	20	6.60	5.3	125